

THE LITHOBIOMORPHA OF THE SOUTHEASTERN STATES.

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In this paper is summarized our present knowledge of the genera and species of the Lithobiomorpha occurring in the extensive region lying south from Kentucky and the Virginias and east of the Mississippi river. The great majority of the records given are based upon collections made by the author himself in the summer of 1910, during which season all of the states in the territory indicated, excepting Florida, were visited. The southern portion of Georgia and the coastal region of this state and of the Carolinas were not covered. Some species additional to those here listed are likely to be found in these sections. The season was favorable for members of this group; and it is felt that the great majority of the more widespread forms were secured. In this connection it may be noted that in the case of most of the species specimens were taken in a considerable number of localities and that all the species previously recorded were again found excepting two from southern Georgia and Florida, where, as before mentioned, collections were not made.

Of especial interest are the genera *Buethobius* and *Wato-*
bius, here erected for the first time, and *Zygethobius*, previously established by the author for a species occurring in the high mountain ranges of the western United States. The finding of a second species of *Zygethobius* in the mountainous section of this southeastern region fulfills what had been anticipated as likely. The three genera named are annectant and must alter to a considerable degree some prevalent conceptions as to affinities within the suborder. The genera recognized in the present paper may be separated as follows:

KEY TO GENERA.

- a. Legs bearing bristles only, no articular spines present excepting sometimes one at distal end of tibia of all but last pairs of legs but this usually replaced by an acutely pointed process.
 - b. First leg-bearing segment with a pair of spiracles.
 - c. A single pair of ocelli; tarsi of first thirteen pairs of legs undivided, those of the last two pairs biarticulate. . . . *Lamyctes* Meinert.
 - bb. First leg-bearing segment without spiracles.
 - c. Tarsi of first thirteen pairs of legs undivided, those of the last two pairs biarticulate; ocelli none.
Buethobius gen. nov.

- cc. Tarsi of all legs biarticulate; ocelli present.
- d. A single pair of ocelli present; an acutely pointed process at distal end of tibia; reproduction seemingly parthenogenetic, no males occurring. *Zygethobius* Chamberlin.
- dd. A number of pairs of ocelli present, forming a patch on each side of the head; a spine at distal end of tibia; males occurring *Watobius* gen.nov.
- aa. Legs provided with articular spines as well as with bristles; no acute process at distal end of tibia on cephalic side.
- b. Coxal pores in a single series *Lithobius* Leach.
- bb. Coxal pores scattered or in several series. *Bothropolys* Wood.

Genus *Lamyctes* Meinert.

1. *Lamyctes tivius* sp. nov.

Slender, widest at tenth dorsal plate, very gradually attenuated cephalad, more abruptly caudad.

Dorsum yellow to light brown, the head, prehensorial feet and ultimate segments darker; antennae and legs yellow.

Antennae of moderate length, composed of twenty-eight to thirty-one articles; first two articles long, the third and fourth very short, the fifth and sixth longer, the seventh and eighth again very short, the ninth longer, the tenth and eleventh in turn shorter, the twelfth and subsequent articles comparable to the ninth, or the thirteenth and fourteenth in some reduced; this alternation of pairs of shorter articles with longer ones in proximal portion of antennae apparently constant in this species.

A single pair of large ocelli.

Prosternal teeth 2+2, small, or 3+3, the outer one on each side smallest.

Angles of none of the dorsal plates produced.

Coxal pores small, round, 2, 3, 3, 3.

Anal legs long and slender, the joints of tarsus especially so; pre-femur long, clearly more slender proximally than that of the penult pair, clavately enlarged distad; tibia of nearly uniform diameter throughout length, the first tarsal joint of similar shape and length but more slender. (See Pl. 3, fig. 2 cf. also figs. 1 and 3).

Claw of gonopods entire. Basal spines 2+2, rather stout, the inner considerably smaller.

Length 6-7.5 mm.

Localities.—Byram and Holly Springs, Miss.; New Orleans, La.; Jackson, Ala.; Atlanta, Ga.; Hot Springs, N. C.

2. *Lamyctes tivius* var. *pius*, var. nov.

Agreeing in general with the species as above described but conspicuously longer and more robust, the length of specimens examined lying between 9 and 9.5 mm. Color uniformly darker.

Locality.—Hot Springs, N. C.

Genus **Buethobius** gen. nov.

First leg-bearing segment without spiracles.

Ocelli none.

Tarsi of the first thirteen pairs of legs undivided, those of the fourteenth and fifteenth pairs biarticulate.

Legs without true spines. Tibiae of the first thirteen pairs of legs with an acutely pointed process at distal end on cephalic side like that of *Lamyetes* and *Zygethobius*. (See Pl. 4, fig. 1).

Apparently only females found and the reproduction parthenogenetic.

Type.—*Buethobius oobitus* sp. nov.

3. **Buethobius oobitus** sp. nov.

General color yellow or light yellowish brown; the head and prehensorial feet and in some the ultimate segments clear orange; antennae and legs clear yellow.

Rather slender, for most of length parallel sided. Narrowed over a few segments behind head and more abruptly at caudal end.

Antennae long, reaching the ninth body segment; composed of thirty-six articles of which those beyond the second are rather short, uniform.

Prosternal margin wide; teeth 3+3, very small.

Ocelli none.

Angles of none of the dorsal plates produced.

Coxal pores round, moderate in size; 3, 3, 3, 3—4, 4, 4, 4.

Legs of the first thirteen pairs each ending in three claws; those of the fourteenth and fifteenth pairs with the claws single. Anal legs long and slender.

Claws of gonopods undivided; basal spines 2+2.

Length 10–12 mm.; width at the tenth plate 1.3–1.4 mm.

Locality.—Byram and Canton, Miss.

Genus **Zygethobius** Chamberlin.Sub-genus **Zantethobius** subgen. nov.

Angles of the sixth, seventh, ninth, eleventh and thirteenth dorsal plates produced.

Type.—*Zygethobius pontis*, sp. nov.

The previously described species, *Z. dolichopus* Chamb., the type of the genus, may be placed in a subgenus *Zygethobius* sens. str.

4. **Zygethobius pontis** sp. nov.

Moderately robust; strongly narrowed caudad and cephalad of the tenth dorsal plate, the first leg-bearing segment especially narrow.

Dorsum in color somewhat chestnut, with a narrow median longitudinal stripe blackish, the first segment darker than the others; head deep to blackish brown; prehensorial feet and antennae reddish, the

latter becoming paler, yellowish, distad; venter yellowish to light brown, the caudal plates reddish; legs brown, paler proximally than distally; last pairs of legs darker, blackish proximally, pale distad.

Antennae very long; composed of forty-three articles which are short.

The ocelli of the single pair very large.

Prosternal teeth 3+3.

Angles of the sixth, seventh, ninth, eleventh and thirteenth dorsal plates produced.

Coxal pores 3, 4, 4, 4.

The process at distal end of anterior pairs of legs apically acutely spinescent. (See Pl. 4, fig. 2).

Anal legs long and slender.

Claw of gonopods entire; basal spines 2+2.

Length ad 10.5 mm.; width of tenth plate 1.6 mm.

Localities.—Johnson City, Tenn.; Natural Bridge, Va.

Genus *Watobius* gen. nov.

First leg-bearing segment without spiracles.

A number of pairs of ocelli present, these forming a patch on each side of the head as in *Lithobius*, a caudal one in the place of the so-called single ocellus in the latter genus and the others toward the base of the antenna.

Tarsi of all legs biarticulate.

Legs without true spines excepting one at distal end of tibia of anterior legs in place occupied by the process in the preceding genera.

Fifth joint in penult legs of male greatly enlarged, the anal (in type) not modified.

Both sexes occurring.

Type.—*Watobius anderisus* sp. nov.

5. *Watobius anderisus* sp. nov.

Slender, attenuated from the tenth dorsal plate cephalad, more abruptly caudad.

Brown, the ultimate segments often darker; head and prehensorial feet conspicuously darker, deep brown or brownish black; antennae brown, pale distad; legs light brown, the posterior pairs having a purplish tinge, the anal and penult pairs abruptly pale distad of the femur, the tibiae in the penult legs especially pale.

Angles of the ninth, eleventh and thirteenth dorsal plates produced.

Antennae short; in most composed of twenty-two articles, in some of but twenty; articles decreasing in length gradually and uniformly from the first to the penult.

Ocelli on each side composed of one large posterior one, in place of the single one in *Zygethobius*, etc., and of eight smaller ones in a patch arranged in three series; thus, 1+3, 3, 2.

Prosternal teeth 2+2.

Angles of the ninth, eleventh and thirteenth dorsal plates produced.

Coxal pores small, 2, 2, 2, 2.

All legs with three claws excepting those of the ultimate pair which seem to have the exterior accessory claw but to lack the inner one.

Anal legs of male moderately and uniformly crassate; the penult legs with the fifth joint strongly enlarged and somewhat flattened dorso-ventrally, complanate above or weakly depressed, complanate and weakly furrowed beneath. (See Pl. 3, figs. 4 and 5).

Claw of female gonopods tripartite; basal spines 2+2.

Length 7.5-9.5 mm.

Localities.—Thomasville and Anniston, Ala.; Tallulah Falls and Bremen, Ga.

Genus *Lithobius* Leach.

Several of the species listed under this genus below conform to *Monotarsobius* as defined by Verhoeff in having the anterior tarsi (those of the first thirteen pairs of legs) undivided whereas those of species belonging to *Lithobius* proper have the tarsi all biarticulate. However, this character seems variable to such an extent that it is difficult to place some species upon this basis; hence, it seems best not to maintain it until some correlated characters, if such exist, shall be worked out. Those species which have the anterior tarsi clearly undivided are specially indicated below.

6. *Lithobius coecus* Bollman.

1888. *Lithobius coecus*, Bollman, Ann. N. Y. Acad. Sci., p. 111.

Locality.—Saluda, N. C. The only other known locality for this species is that at which the types were collected, Beaver Creek, Tenn.

7. *Lithobius tuobukus* sp. nov.

Light brown to yellow, the posterior segments often darker; head concolorous with body or often a darker, reddish brown; antennae light brown proximally, paler distad; legs light brown, the posterior pairs yellow, especially bright distad.

Antennae short or moderate; articles 25-29, all except the first few moderate or short in length.

Prosternal teeth mostly 5+5 or 6+6, small, even.

Ocelli compactly arranged in an oblong patch in three series; thus 1+4, 5, 4, a total of 14.

None of the dorsal plates with the posterior angles produced.

Coxal pores rather small, round, 3, 4, 4, 3.

Last two pairs of coxae armed laterally, the last four pairs dorsally.

Spines of the first legs 2, 2, 1; of penult 1, 3, 3, 2, the claw single; of the anal 1, 3, 3, 2, the claw also single.

In the male the anal legs are moderately crassate, especially the third and fourth joints; the fourth joint is flattened or somewhat excavated dorso-mesally and is often produced at distal end into a lobe extending mesad and bearing at its apex a spine directed caudad, but in many this lobe is absent. (See Pl. 3, fig. 7).

Claw of the gonopods in female entire; spines 2+2.

Length 9.5-12 mm.

Localities.—Brown's Summit, N. C.; Natural Bridge, Chatham, and Lynchburg, Va.; White Sulphur, W. Va.; Hot Springs, Linville Falls, Asheville, N. C.; Greenville, S. C.; Russellville, Johnson City and Unaka Springs, Tenn.; Lexington, Ky.

Very close to species 12 but the penult legs with only one claw instead of with three. Mr. Bollman mentions no modification in the anal legs of the male of *L. proridens* nor does the specimen listed below under this species present such. The only course open at present, therefore, seems to be to separate the present species from *proridens* and possibly to assume, judging from localities given for *proridens*, that Bollman has included the two species under one name.

8. *Lithobius watovius* sp. nov.

General color yellow; head, prehensorial feet and posterior segments darker, orange; antennae and legs yellow.

Antennae short, composed of twenty articles which, excepting the first two and the ultimate, are moderately short.

Prosternal teeth 2+2 or 3+3, the outer tooth on each side weak or obsolete.

Ocelli about four, arranged in one or two series; thus 1+2, 1.

Angles of none of the dorsal plates produced.

Tarsi of the first thirteen pairs of legs undivided, those of the last two pairs biarticulate as usual (*Monotarsobius*).

Coxal pores 1 (2), 2, 2, 2.

Ultimate pair of coxae laterally armed, the last three pairs dorsally armed.

Spines of the first legs 0, 2, 1-1, 2, 1, (2); of penult 1, 3, 3, 0, without supplementary claw; of anal 1, 3, 1, 0, also without supplementary claw.

Anal and penult legs in the male uniformly crassate.

Length 6.7 mm. (larger specimen).

Locality.—Byram, Miss. Two males were taken.

9. *Lithobius paitius* sp. nov.

Dorsum pale brown; head and posterior segments darker, dark orange; legs greyish, except the caudal pairs which are bright yellow, with the brush of hairs on anal legs of male red proximally and yellow distad; antennae grey to dull yellow; venter pale grey to greyish yellow.

Antennae short, consisting mostly of twenty-four articles which are short excepting the first two and the ultimate.

Ocelli small, in a small patch; in number about seven, arranged thus, 1+3, 3.

Prosternal teeth 2+2.

Angles of none of the dorsal plates produced.

Coxal pores 2, 4, 4, 3, small.

Last pair of coxae laterally armed, last two pairs dorsally armed.

Tarsi of the first thirteen pairs of legs undivided (*Monotatsobius*).

Spines of the first legs 0, 1, 1; of the penult 1, 3, 2, 1, without supplementary claw; of anal 1, 3, 2, 0, also without supplementary claw.

In the anal legs of the male the fourth joint is strongly swollen and provided at proximal end with a lobe on dorso-mesal surface from the posterior surface of which springs a dense brush of very long hairs which projects beyond the caudal end of the joint. (See Pl. 3, fig. 6).

In the female the claw of the gonopods is bluntly tripartite, the lateral lobes being not much lower than the middle one; basal spines as usual, 2+2.

Length 6.5-7 mm.

Locality.—Catawba, N. C.; Unaka Springs, Tenn.

10. *Lithobius watsuitus* sp. nov.

Dorsum light brown; head much darker, reddish brown or chestnut; prosternum colored like head, but its feet pale distad; antennae dark brown, paler distad; venter with the anterior plates commonly with purplish tinge; most legs light yellowish brown, but the caudal pairs darker, brown, excepting tarsi which are light.

Antennae short; composed of thirty to thirty-two articles which, beyond the third are short and compactly united.

Ocelli about eight, arranged in two series; thus 1+4, 3.

Prosternal teeth, 2+2.

Angles of none of the dorsal plates produced.

Coxal pores small and round, 2, 3, 3, 3-3, 3, 3, 3.

Ultimate coxae laterally as well as dorsally armed.

Spines of the first legs 1, 2, 1; of penult 1, 3, 3, 1, one supplementary claw present; of anal 1, 3, 2, 0, the claw single.

Anal and penult legs in the male crassate, especially so the fourth joint which is somewhat flattened dorso-ventrally and is longitudinally weakly furrowed.

Length 7.5-9 mm.

Localities.—Atlanta, Ga.; Natural Bridge, Va. The specimen from Virginia differs in having the spines of the anal legs 1, 3, 2, 1, instead of 1, 3, 2, 0.

11. *Lithobius bilabiatu*s Wood.

1867. *Lithobius bilabiatu*s, Wood, Proc. Phil. Acad. Sci., p. 130.
 1887. *Lithobius tuber*, Bollman, Proc. U. S. N. M., p. 256.

Localities.—Canton and Byram, Miss. This species is found in the states along the Mississippi river from the Gulf to Wisconsin and Minnesota. It seems to be most abundant in Illinois and Iowa.

12. *Lithobius proridens* Bollman.

1887. *Lithobius proridens*, Bollman, American Naturalist, p. 81.
 1887. *Lithobius proridens*, Bollman, Proc. U. S. N. M., p. 258.

Locality.—Waternalley, Miss. One male agreeing fully with the original description. Previously reported from Indiana (type locality), Washington, D. C.; Arkansas, and Tennessee (Knoxville, Mossy Creek).

13. *Lithobius branneri* Bollman.

1888. *Lithobius branneri*, Bollman, Ann. N. Y. Acad. Sci., p. 107.
 1888. *Lithobius branneri*, Bollman, Proc. U. S. N. M., p. 111, 112, 342.

Localities.—Brookhaven, Miss. (var. a); Maplesville, Ala.; Atlanta, Ga. (var. b); Catawba and Brown's Summit, N. C.; Asheville, N. C. (var. c); Russellville and Unaka Springs, Tenn. (author). Also Knoxville, Beaver Creek, and Mossy Creek, Tenn. (J. C. and C. B. Branner, seq. Bollman).

Several closely related varieties are represented in the material here referred to this species. The incompleteness of the original description must make it doubtful which variety is typical until the types are re-studied. The species has the anterior tarsi undivided (*Monotarsobius*).

14. *Lithobius lundii* Meinert.

1886. *Lithobius lundii*, Meinert, Myr. Mus. Haun., III p. 111.
 1887. *Lithobius lundii*, Bollman, Proc. U. S. N. M., p. 111.

Localities.—Lula and Tallulah Falls, Ga.; Taylor's, S. C.; Asheville and Hot Springs, N. C.; Johnson City and Unaka Springs (and also Beaver and Mossy Creeks, seq. Bollman), Tenn.; Natural Bridge, Va.

This species, originally described from New York State, ranges into the southern states along the uplands.

15. *Lithobius exiguus* Meinert, var.1886. *Lithobius exiguus*, Meinert, Myr. Mus. Haun, III, p. 110 (11).1911. *Lithobius exiguus*, Chamberlin, Canad. Ent.

Localities.—Longbeach, Brookhaven, Canton, Jackson, and Holly Springs, Miss.; Selma (var. b), Thomasville, Morgan, and Birmingham, Ala.; Jackson, Tenn.; Lexington, Ky.; Lynchburg, Va.

A widespread species occurring commonly under leaves and sticks and among stones along streams in Wisconsin, Illinois, Iowa, and neighboring states as well as throughout the region covered in the present paper.

16. *Lithobius elattus* Bollman.1888. *Lithobius elattus*, Bollman, Proc. U. S. N. M., XI, p. 348.

Localities.—Johnson City and Russellville, Tenn.; Chatham, Lynchburg, Natural Bridge, and Balcony Falls, Va. (also Marksville, Va., and Washington, D. C., seq. Bollman); White Sulphur, W. Va.

The specimens listed here differ somewhat from those described by Bollman in one or two particulars but probably represent the same species.

17. *Lithobius aureus* McNeil.1887. *Lithobius aureus*, McNeil, Proc. U. S. N. M., p. 327.

Locality.—Pensacola, Fla. (seq. McNeil). The two specimens upon which this species was based lack the anal legs. As a result it is difficult to identify the species from the published description.

18. *Lithobius pinguis* Bollman.1888. *Lithobius pinguis*, Bollman, Entom. Americana, IV, p. 7.

Localities.—Hudsonville, Miss.; (Little Rock, Ark., the type locality, seq. Bollman).

Because of the incompleteness of the original description and the fewness of the specimens upon which based the reference of the specimens in hand to this species is provisional. It is possible that the following species may have to be merged with the present one; but in view of the important differences between the specimens of *L. euthus* and Mr. Bollman's description, this union at present seems impossible.

19. *Lithobius euthus* Chamberlin.1904. *Lithobius euthus*, Chamberlin, Proc. Acad. Sci. Phil., p. 652.

Localities.—Byram, Canton, and Gulfport, Miss.

20. *Lithobius cantabrigensis* Meinert.

1885. *Lithobius cantabrigensis*, Meinert, Proc. Amer. Phil. Soc., XXI, p. 177.

1888. *Lithobius cantabrigensis*, Bollman, Proc., U. S. N. M., XI, p. 342.

Localities.—Greenville, S. C.; Saluda, N. C.; Balcony Falls, Va.; Russellville, Tenn.; (also Beaver and Mossy Creeks, Tenn., seq. Bollman).

Described originally from Mass., the only other recorded locality.

The species seems to have a strong tendency toward the formation of local varieties.

21. *Lithobius cantabrigensis* var. *suitus*, var. nov.

Dorsum brown; the head and posterior segments darker, reddish; antennae pale distally; legs pale brown, the posterior pairs darker but with their distal joints distinctly lighter.

Antennae moderate, composed of from twenty-nine to thirty-two articles.

Ocelli about eight or nine arranged in two or three series; thus, 1+4, 4, or 1+3, 3, 1.

Prosternal teeth 2+2.

Angles of the eleventh and thirteenth dorsal plates produced or these in some nearly straight.

Coxal pores round, 3, 4, 4, 3.

Posterior coxae unarmed.

Spines of the first legs 0, 0, 1-0, 1, 1; of the penult 1, 3, 2, 1-1, 3, 3, 1, with two claws; of the anal, 1, 3, 2, 0, with two claws.

Gonopods in the female with the claw tripartite or almost bipartite in some through reduction of one lateral lobe.

Length 7-9 mm.

Localities.—Hot Springs, N. C.; Birmingham, Ala.

The anterior tarsi in part seem consolidated or undivided, but the form scarcely would conform to *Monotarsobius*.

22. *Lithobius cantabrigensis* var. *zinus* var. nov.

Color brown; head and posterior segments darker, not reddish; antennae dark, paler distally.

Antennae composed mostly of from twenty-eight to thirty-one articles, more rarely thirty five or even thirty-seven.

Ocelli eleven to sixteen, arranged in three or four series; thus, 1+4, 4, 4, 3-1+3, 4, 3.

Ultimate coxae laterally armed.

Spines of the first legs 1, 1, 1-1, 2, 1; of penult legs, 1, 3, 3, 1-1, 3, 3, 2, with two claws; of the anal legs 1, 3, 2, 0-1, 3, 2, 1, likewise with two claws.

In the male the anal and penult legs moderately crassate, the fourth joint in the anal ones larger and somewhat complanate dorsally.

Length 8-10 mm.

Localities.—Talapoosa and Bremen, Ga.; Anniston, Ala. (variant); Brown's Summit, N. C.; Chatham, Natural Bridge, and Lynchburg, Va.

24. *Lithobius atkinsoni* Bollman.

1887. *Lithobius atkinsoni*, Bollman, Proc. U. S. N. M., X, p. 625.

1888. *Lithobius atkinsoni*, Bollman, Proc. U. S. N. M., XI, p. 349.

Bremen, Atlanta, Lula, and Tallulah Falls, (also Macon, seq. Bollman), Ga.; Taylor's, Greenville and Seneca, S. C.; Saluda and Hot Springs (also Balsam seq. Bollman), N. C.

The localities here indicated are all those thus far recorded for this species.

24. *Lithobius naiwatus* sp. nov.

Brown; the head and posterior segments darker; antennae pale distad; legs yellowish to whitish brown; the anal and sometimes also the penult legs dark purplish brown or purplish black, with the distal joints pale.

Antennae of moderate length or short; composed of thirty-two to thirty-five articles of which most of the first ten are of medium length and those more distad short.

Ocelli about thirteen, compactly arranged in three straight series; thus, 1+5, 4, 3.

Prosternal teeth 2+2.

Posterior angles of the ninth, eleventh and thirteenth dorsal plates produced.

Coxal pores small, round, 4, 5, 5, 4.

Last two pairs of coxae armed laterally, last three pairs armed dorsally.

Spines of first legs, 1, 2, 1-2, 2, 1; of the penult legs 1, 3, 2, 1-1, 3, 2, 0, with two claws; of the anal legs 1, 3, 3, 2, with a single claw.

Anal and penult legs in male moderately crassate, without special lobes or processes.

Claw of the gonopods in the female tripartite; basal spines 2+2, conical, the inner smaller.

Length 11-13 mm.

Localities.—Saluda, Catawba, and Linnville Falls, N. C.; Landrum, S. C.; Tallulah Falls, Ga.; Unaka Springs, Tenn.; Lexington, Ky. (var.)

25. *Lithobius forficatus* (Linneus).

1758. *Scolopendra forficata*, Linneaus, Syst. Nat., I, p. 638.

1815. *Lithobius forficatus*, Leach, Tr. Linn. Soc., XI.

1821. nec *Lithobius spinipes* Say, Journ. Acad. Sci. Phil., II, p. 108.

1845. *Lithobius americanus*, Newport, Tr. Linn. Soc., XIX, p. 365.

Localities.—Greenville, S. C.; Asheville and Hot Springs, N. C.; Lynchburg and Balcony Falls, Va.; White Sulphur, W. Va.; Fulton and Lexington, Ky.

The range of this species, so abundant in the north, is carried southward into our present territory by the mountain ranges. It has not previously been reported from the Carolinas or other points so far south in this district.

26. *Lithobius celer* Bollman.

1888. *Lithobius celer*, Bollman, Entom. Amer., IV, p. 7.

1909. nec. *Lithobius celer*, Chamberlin, Ann. Ent. Soc. America, p. 190.

Locality.—Fulton, Ky.

27. *Lithobius oedipes* Bollman.

1888. *Lithobius oedipes*, Bollman, Entom. Amer., IV, p. 8.

Locality.—Mississippi.

28. *Lithobius manegitus* sp. nov.

Dorsum dark brown; head darker, nearly mahogany, the antennae similar proximally but becoming paler or rufous distad legs brown above, mostly paler ventrally, and the posterior pairs mostly pale distad.

Antennae moderate; composed of twenty articles which decrease in length from the second distad to the penultimate.

Ocelli in a patch situated apparently closer than usual to the base of antenna; in number about nine, arranged in three series; thus 1+3, 3, 2.

Prosternal teeth 2+2; a characteristic stout spine uniformly present on each side ectad of the outer tooth.

Angles of the ninth, eleventh and thirteenth dorsal plates produced.

Coxal pores round, in number 5, 5, 5, 4.

Last two pairs of coxae armed laterally; only the ultimate coxae armed dorsally.

Spines of the first legs 1, 2, 1-2, 2, 1; of the penult 1, 3, 3, 2, with two claws; of the anal 1, 3, 3, 1, provided also with two claws.

In the male the anal legs are crassate and the tibia or fifth joint is conspicuously furrowed lengthwise dorsally toward the exterior side, the furrow being fringed on each side by a dense growth of hair, the hair longest at posterior end (See Pl. 4, fig. 7). The penult legs more crassate than the anal, the fourth and fifth joints most enlarged; the fifth joint or tibia furrowed from end to end along the meso-ventral surface and excavated on this surface at the distal end where there is a process bearing a conspicuous brush of hairs which projects mesad (See Pl. 4, figs. 4, 5 and 6.)

The gonopods of female with the claw entire; basal spines 2+2, conical, the inner the smaller.

Length 15-17 mm.

Localities.—Hot Springs, Catawba, Saluda and Linville Falls, N. C.; Johnson City, Unaka Springs and Altapass, Tenn.

Very close to *L. oedipes* Boll., but differing markedly in characters of the anal and penult legs of the male.

29. ***Lithobius tabius*** sp. nov.

Brown; head and commonly also the first dorsal plate darker, chestnut; antennae dark, pale distad; legs a much paler brown, the posterior pairs darker with the distal joints pale.

Antennae short; composed of about thirty-three articles.

Ocelli sixteen, arranged in four series; thus, 1+4, 4, 4, 3.

Prosternal teeth 2+2.

Angles of the ninth, eleventh and thirteenth dorsal plates produced, those of the sixth and seventh excised or obliquely truncate.

Coxal pores round, 4, 4, 4, 3.

Last two pairs of coxae laterally armed, last four pairs armed dorsally.

Spines of first legs 1, 2, 1; of the penult 1, 3, 2, 1, with two claws; of the anal 1, 3, 3, 2, with two claws.

Claws of the gonopods in female tripartite.

Length 10.5 mm.; width at tenth dorsal plate 1.5 mm.

Locality.—Johnson City, Tenn.

In many points very similar to *arienus*, *carolinae*, etc., but the angles of the sixth and seventh dorsal plates not at all produced.

30. ***Lithobius simitus*** sp. nov.

Brown; the head and posterior plates reddish, the former paler cephalad of the frontal suture; antennae dark brown, pale distally; legs whitish brown, the tarsi clear yellow, the posterior pairs darker, the anal pair yellow distad of the femur; venter light brown, darker caudad, the anterior plates with purplish tinge.

Antennae short, composed of twenty-seven to thirty-two short articles.

Ocelli arranged in two series, about eight in number; thus, 1+4, 3.

Prosternal teeth 2+2.

Angles of the ninth, eleventh and thirteenth dorsal plates produced.

Coxal pores small, 2, 3, 3, 3.

Last two pairs of coxae armed laterally, last three pairs armed dorsally.

Tarsi of the first thirteen pairs of legs imperfectly divided in part but suture mostly plainly evident.

Spines of the first legs 0, 0, 0-0, 0, 1; of the penult 1, 3, 2, 0, with two claws; of the anal 1, 3, 2, 0, a supplementary claw likewise present.

Claw of the female gonopods bipartite; basal spines 2+2, conical. Length 7-7.5 mm.

Locality.—Grenada, Miss. Two female specimens.

31. *Lithobius transmarinus* Koch.

1862. *Lithobius transmarinus*, Koch, Die Myriopodeongattung *Lithobius*, p. 31.
 ——. *Lithobius mordax*, Koch, *ibid.*, p. 34.
 1872. *Lithobius mordax*, Meinert, Myr. Mus. Haun., 11 p. 294.
 1875. *Lithobius transmarinus*, Stuxberg, Ofvers. af K. Vet. Akad. Forh. no. 3, pp. 26 and 32.
 ——. *Lithobius mordax*, Stuxberg, *ibid.*, pp. 27 and 32.
 1887. *Lithobius mordax*, Bollman, Proc. U. S. N. M., p. 263, etc.
 ——. *Lithobius transmarinus*, Bollman, *ibid.*, p. 626, etc.
 1893. *Lithobius spinipes*, Bollman, (of Say??), Bull. U. S. N. M., 46, p. 146.
 1896. *Lithobius mordax* var. *Louisianae*, Brölemann, Ann. Soc. Ent. de France, p. 48.
 ——. *Lithobius transmarinus* var. *perinatus*, Brölemann, *ibid.*, p. 48.

Localities.—Brookhaven, Fernwood, Holly Springs, Byram, Canton, Biloxi, Ocean Springs, and Longbeach, Miss.; New Orleans, La.; Jackson, Mobile, and Salem, Ala.

Apparently Koch based his description of *transmarinus* upon a female while his description of *mordax* is clearly that of the male. The differences pointed out between the anal legs of these two forms are essentially secondary sexual characters as found in male and female of the present species, although the longitudinal furrows on the mesal surface of the sixth and seventh joints in the female vary in development and may be deeply impressed in some, in others evident upon one or the other of the joints alone, or may be quite absent as seems to be more commonly the case in the males. Similarly Brölemann (Ann. Ent. Soc. Fr., 1896, pp. 48-49) in arguing for the distinctness of *transmarinus* and *mordax* relies almost wholly upon secondary characters and does not inform us as to whether he is speaking of male or female. He says: "Pour ce qui est des deux espèces de Koch, il me semble qu'il ne peut y avoir de confusion, puisque le 4e article des pattes anales des *mordax* est très court, très renflé, parcouru en dessus par un profond et large sillon, ce qui n'est nullement le cas chez le *transmarinus*." But this is true only of males while the females conform to Brölemann's *transmarinus*, which must accordingly be regarded as the same species.

32. *Lithobius xenopus* Bollman.

1888. *Lithobius xenopus*, Bollman, Proc. U. S. N. M., XI, p. 350.

Locality.—Tallulah, Ga. (L. M. Underwood).

33. *Lithobius vorax* Meinert.

1872. *Lithobius vorax*, Meinert, Myr. Mus. Haun., 11, p. 292.
 1875. *Lithobius vorax*, Stuxberg, Ofvers. af K. Vet. Akad. Forh. no. 3, p. 26 and 32.
 1885. *Lithobius latzeli*, Meinert, Proc. Am. Phil. Soc., XXI, p. 175.
 1887. *Lithobius clarus* McNeil, Proc. U. S. N. M., X, p. 326.
 ——. *Lithobius tyrannus*, Bollman, *ibid.*, p. 636.

Localities.—Byram, Fernwood, Watervalley, Canton, Holly Springs, Grenada, Jackson, Biloxi (type locality), Longbeach and Ocean Springs, Miss.; Pensacola, Fla. (*clarus* McNeil); Jackson and Birmingham, Ala.; Brown's Summit, N. C.; Crandall, Marksville and Luray, Va. (*latzeli*, seq. Meinert and Bollman.)

There is marked variation in this species in the development of the claws of the penult legs. There is a distinct anterior or third claw in the specimens from some localities (such as Holly Springs, Fernwood, Longbeach, Miss., and Jackson, Ala., etc.) which seems to be especially well developed in younger or smaller specimens (cf. *clarus* McNeil) but which is readily broken off and tends in older specimens to become relatively reduced, obsolete or absent. Because of this it would seem justifiable to regard *clarus* as having been based upon small specimens of this species since no other difference appears in the description given. Specimens from North Carolina and Virginia seem to show a tendency for the coxal pores to be round or oval rather than strongly transverse more frequently than in specimens from the Gulf region; but there are no constant differences in this respect and both extremes with intermediates are to be found in the more southern localities. Hence, no grounds in this direction appear why *L. latzeli* should be kept apart from *vorax*. The longitudinal sulcus which Meinert mentions as occurring on the ventral surface of the third and fourth joints of the anal legs in *latzeli* is present in all specimens of *vorax*. The sulcation on the mesal surface of the tarsal joints of anal and penult legs mentioned by Bollman as distinctive of his *tyrannus* is present in most specimens of *vorax*. The articles of the antennae vary greatly in number with the size of the individual, from twenty-six or twenty-seven in young specimens fourteen or fifteen millimeters in length to above forty in the largest adults. The average number in medium size adults would seem to be about thirty-five or thirty-six.

34. ***Lithobius underwoodi*** Bollman.

1888. *Lithobius underwoodi*, Bollman, Proc. U. S. N. M., XI, p. 350.

Localities.—Maplesville, Selma, Morgan, Thomasville, Jackson, and Anniston, Ala.; Atlanta, Tallulah Falls, (and Macon, type locality, seq. Bollman), Ga.; Landrum and Seneca, S. C.

Especially abundant in Alabama where it seems to be the most common of the larger species.

35. **Lithobius rex** Bollman.1888. *Lithobius rex*, Bollman, *Procl. U. S. N. M.*, XI, p. 350.

Locality.—Tallahula, Ga. (L. M. Underwood).

36. **Lithobius carolinae** sp. nov.

Medium or slender.

Dorsum brown to brownish yellow; head much darker, chestnut; prosternum dark brown; antennae bark brown, pale or rufous distally; legs light brown or yellow, the posterior pairs darker but light distally; venter pale.

Antennae short; composed of thirty to thirty-five articles.

Ocelli about ten or twelve, arranged in three series; thus, 1+4, 3, 3.

Prosternal teeth 2+2.

Angles of the sixth, seventh, ninth, eleventh and thirteenth dorsal plates produced.

Coxal pores 3, 4, 4, 3, round.

Last two pairs of coxae laterally armed, last three pairs dorsally armed.

Spines of first legs 0, 0, 1; of penult 1, 3, 2, 1, with two claws; of the anal 1, 3, 2, 0, or rarely 1, 3, 2, 1, also with two claws.

Claws of gonopods in female tripartite; basal spines 2+2.

Length 8-9.5 mm.; width of tenth dorsal plate 1.2-1.5 mm.

Localities.—Asheville and Hot Springs, N. C.; Landrum and Taylor's (var.), S. C.; Russellville, Tenn.

This species would seem to be related to *L. juvenus* of Bollman, but the sixth dorsal plate has the posterior angles more or less produced and the spining of the legs is constantly different.

37. **Lithobius arienus** sp. nov.

Robust.

Dorsum brown; head together with anterior and posterior plates darker, not reddish; antennae brown, darkened distad; legs pale yellow, the posterior pair darker; venter pale, the prosternum and posterior plates slightly darker.

Antennae moderately long; composed of thirty-four articles.

Ocelli compactly arranged in four longitudinal series; thus 1+4, 4, 3, 3, a total of fifteen; ocelli of the two upper rows larger.

Prosternal teeth 2+2.

Sixth, seventh, ninth, eleventh and thirteenth dorsal plates with the posterior angles produced.

Coxal pores ad 3, 4, 4, 3, round.

Last two pairs of coxae laterally armed, the last three pairs dorsally armed.

Spines of the first legs 0, 1, 1; of the penult 1, 3, 3, 2, armed with two claws; of the anal 1, 3, 2, 1, also armed with two claws.

Length 11.5 mm.; width of tenth plate 2 mm.

Locality.—Hot Springs, N. C.

One male. Very close to *carolinae* but conspicuously larger and more robust and differing in the spining of the legs, in the ocelli, in coloration, etc.

Genus **Bothropolys** Wood.

But one species of this genus occurs in the United States east of the Rocky Mountains.—*B. multidentatus*.

38. **Bothropolys multidentatus** Newport.

1845. *Lithobius multidentatus*, Newport, Tr. Linn. Soc., XIX, p. 365.
 1862. *Bothropolys nobilis*, Wood, Journ. Acad. Sci. Phil. V, p. 15.
 1865. *Bothropolys multidentatus*, Wood, Tr. Am. Phil. Soc., XIII, p. 152.
 1875. *Lithobius multidentatus*, Stuxberg, Ofvers. af k. Vet. Akad. Forh.
 1887. *Lithobius multidentatus*, Bollman, Proc. U. S. N. M., p. 263.

Localities.—Canton, Fernwood, and Byram, Miss.; Maplesville and Jackson, Ala.; Catawba, N. C.; Russellville, Tenn.; White Sulphur, W. Va.; Chatham and Balcony Falls, Va.

This species is widespread in the southern states though apparently not so common as farther north. In the section from Virginia to New York state, etc., it is abundant as it is also in corresponding latitudes farther west.

EXPLANATION OF PLATES.

PLATE 3.

- FIG. 1. Left anal leg of *Lamyctes fulvicornis* from the exterior. From specimen 9.6 mm. in length taken at Haugen, Wisconsin.
 FIG. 2. Left anal leg of *Lamyctes tivius* sp. nov. From a specimen 6.6 mm. in length taken at Jackson, Ala. Same magnification as preceding.
 FIG. 3. Left anal leg of *Lamyctes pinampus*. From a specimen 8.6 mm. long taken at Claremont, Cal. Same magnification as the preceding.
 FIG. 4. Right anal leg of *Watobius anderisus*. Specimen from Thomasville, Ala.
 FIG. 5. Right penult legs of *Watobius anderisus*. Same specimen as preceding.
 FIG. 6. Left anal leg of *Lithobius paitius* sp. nov., dorsal aspect.
 FIG. 7. Left anal leg of *Lithobius tuobukus* sp. nov., dorsal aspect.

PLATE 4.

- FIG. 1. Right leg of the fifth pair of *Buethobius oobitus* sp. nov., cephalic aspect.
 FIG. 2. Right leg of the fifth pair of *Zygethobius pontis* sp. nov.
 FIG. 3. Right leg of the fifth pair of *Watobius anderisus* sp. nov., cephalic aspect.
 FIG. 4. Left penult leg of *Lithobius manegitus* sp. nov., ventral aspect.
 FIG. 5. Left penult leg of *Lithobius manegitus* sp. nov., dorsal aspect.
 FIG. 6. Left anal leg of *Lithobius manegitus* sp. nov., dorsal aspect.
 FIG. 7. Prosternum of *Lithobius manegitus* sp. nov., ventral aspect.